

# BEACH SCRAPING: Benefits of an Interim Shore Protection Measure

National Conference on  
Beach Preservation Technology  
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Panama City Beach, FL

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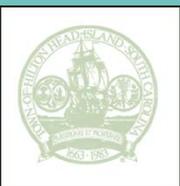
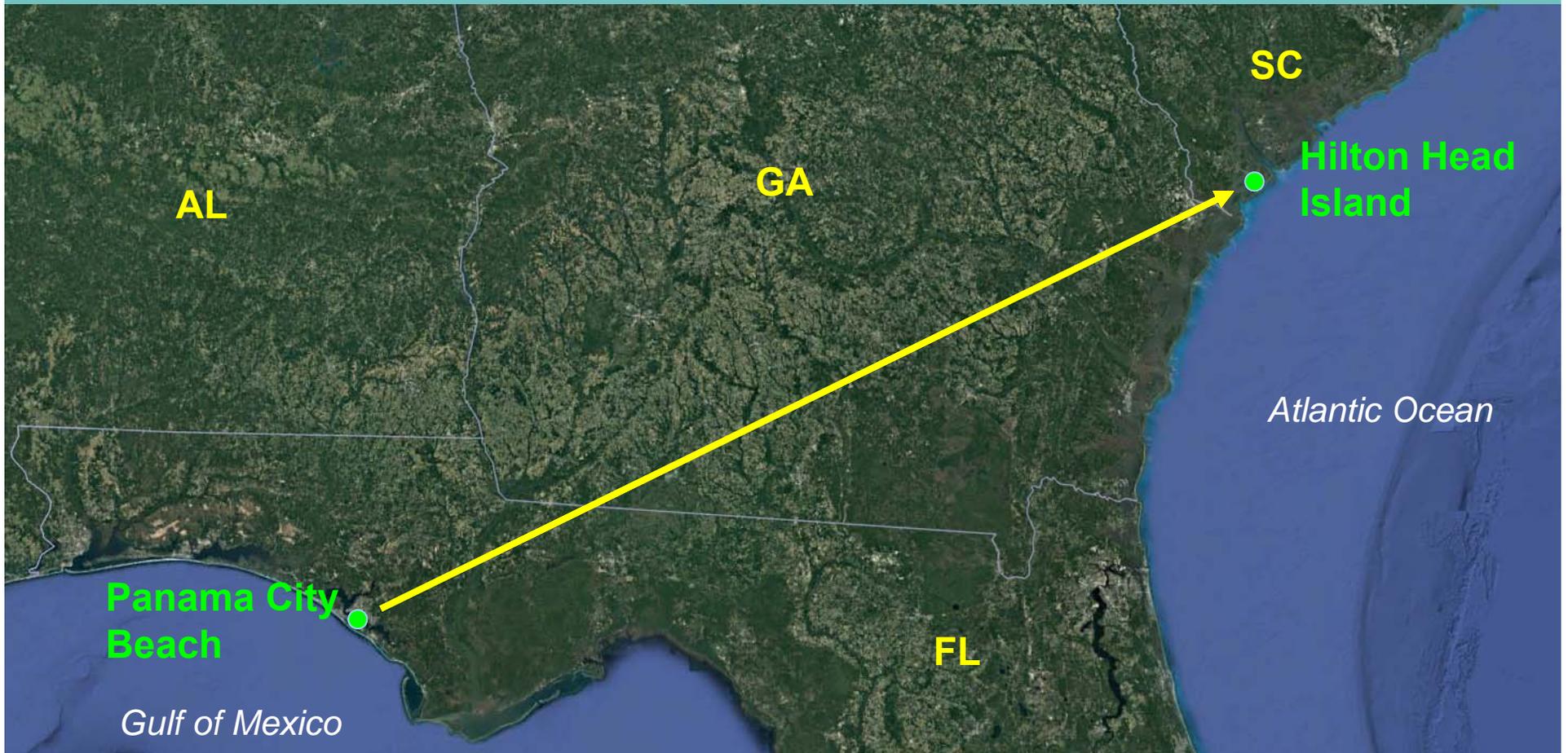
Scott P. Liggett, P.E.  
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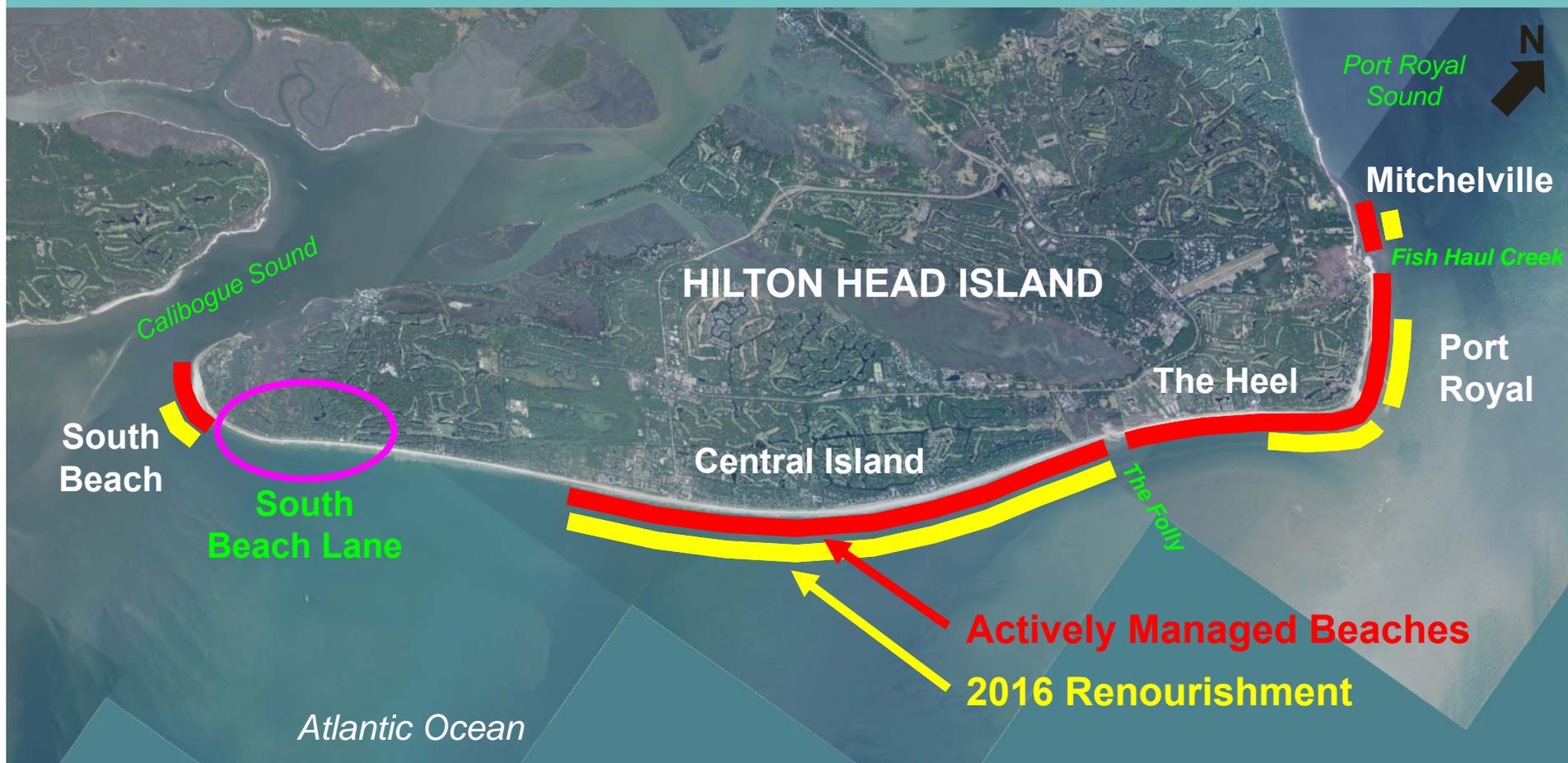


# Hilton Head Island, South Carolina

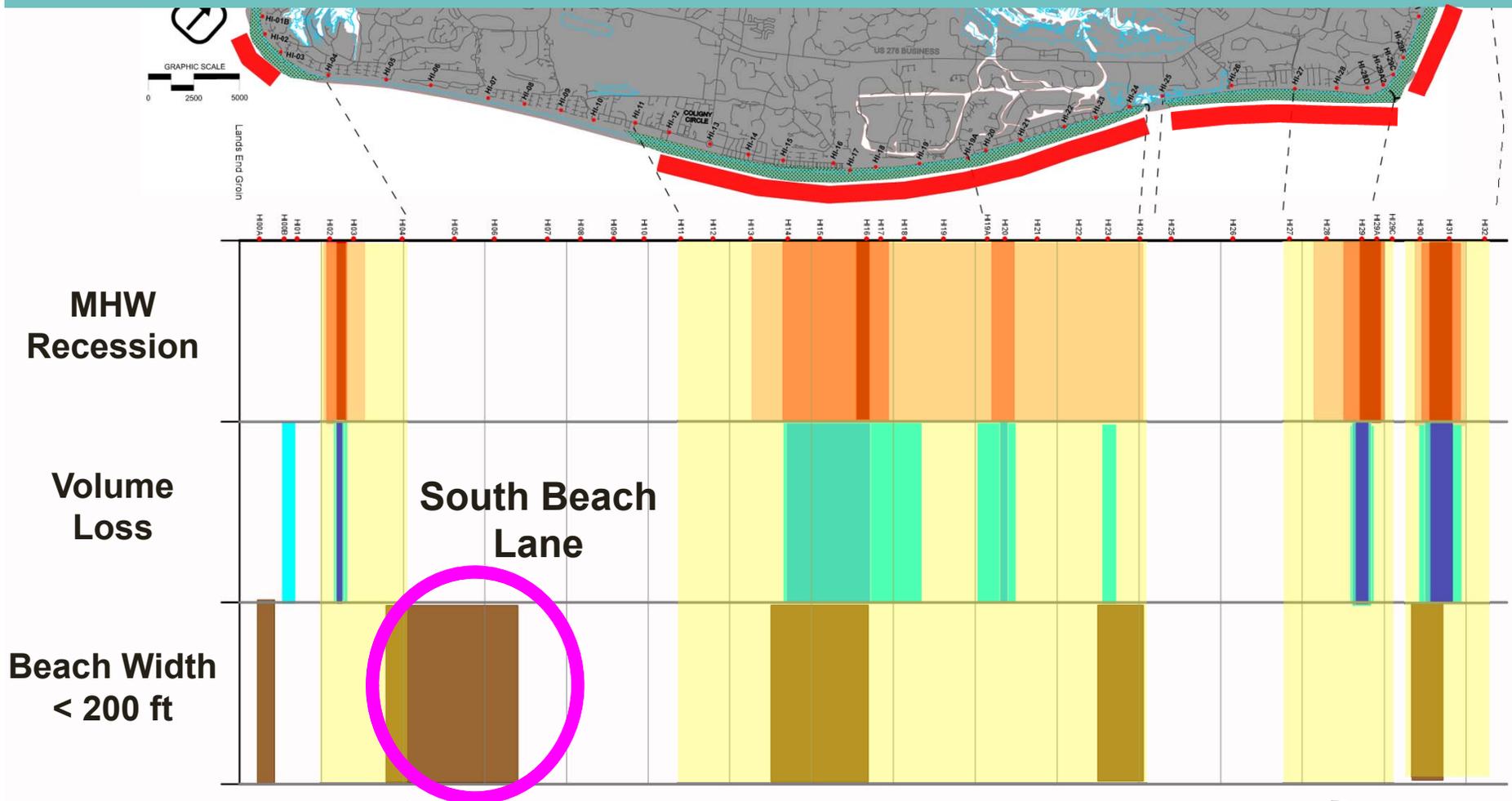


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# HHI Beach Management

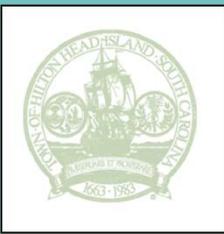


# Change Mar. 2007 - Feb. 2016



Yellow indicates areas of sand placement

## Typical Project Monitoring/Planning

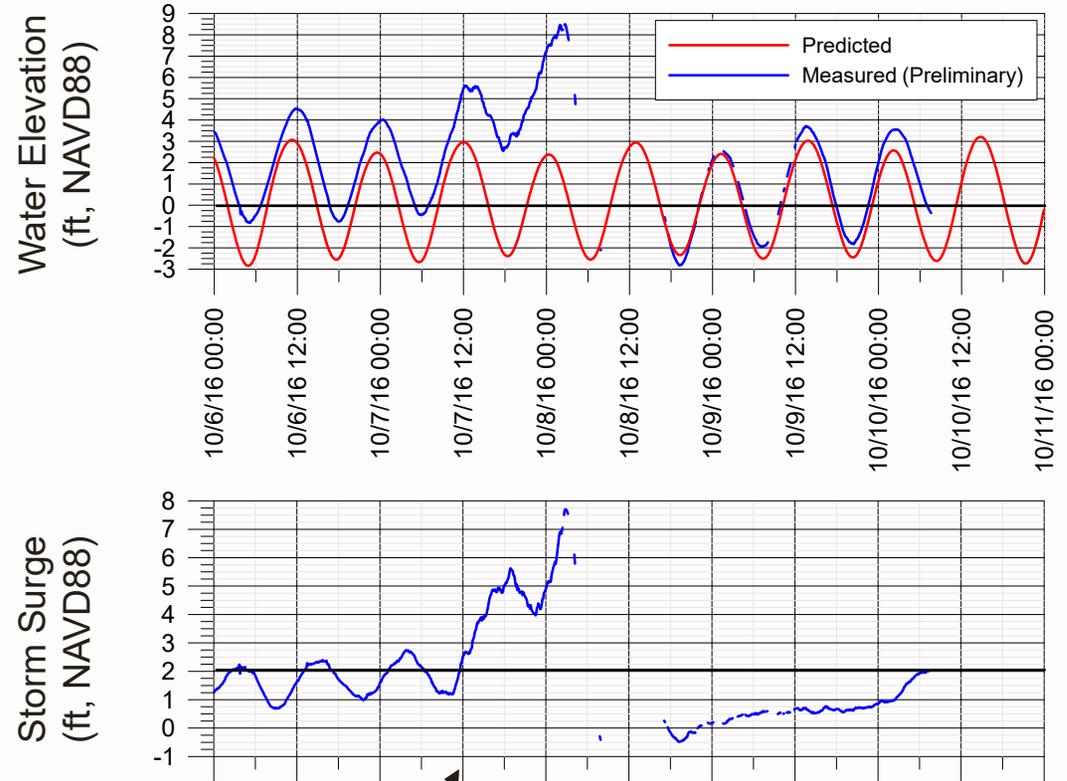


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# Hurricane Matthew (Oct. 2016)



SAVANNAH RIVER ENTRANCE, FORT PULASKI, GA NOAA Station: 8670870



7 October 2016



# Hurricane Matthew - Oct. '16

- **Extensive Coastal Flooding (WL >10 ft NAVD88)**
- **Extensive Frontal Dune Loss**
- **Primary Dune breached** (most severe along non-nourished areas)
- **Upper beach loss ~750 kcy along 16 miles**
  - Average: ~ -9 cy/ft
  - Range: ~ -4 to -17 cy/ft



South Beach Lane

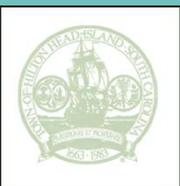


# Post-Matthew Actions

- **Preliminary Damage Assessment (PDA) – Island-wide Impacts**
- **Weeks Marine on site, how could they help?**
  - **Close 25+ breaches in Primary Dune**
  - **Replace ~350,000 cy lost along Central Island**
  - **Address Significant Losses and Threatened Infrastructure along South Beach Lane**
    - No permit in place for sand placement by dredge



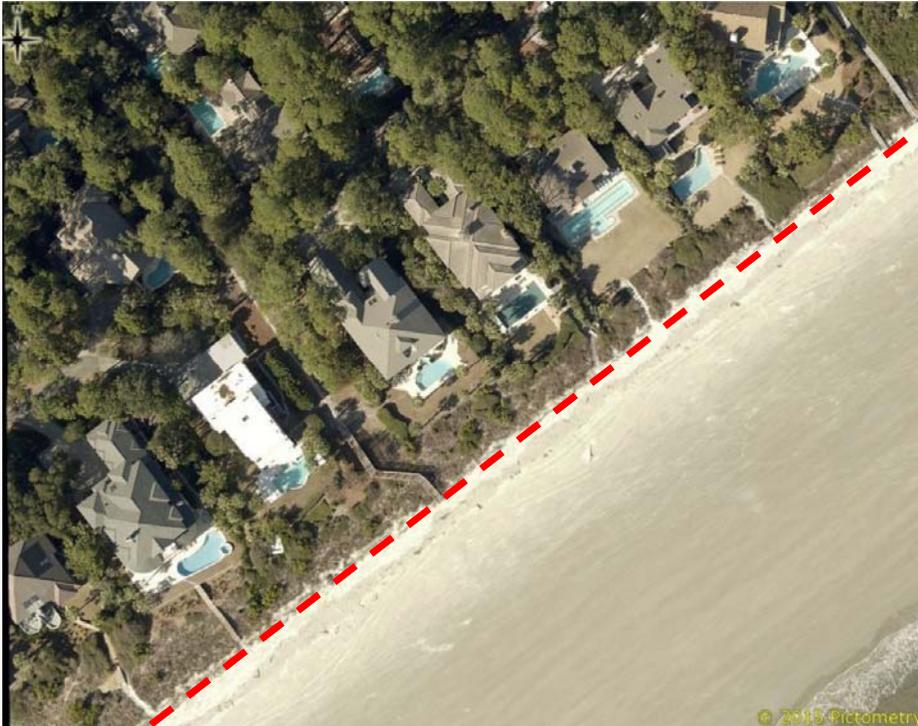
# South Island Impacts



**South Beach Lane Shoreline**  
**Stable to Accretional (1985 to Pre-Matthew)**



# South Beach Lane



**February 2015  
(Pre-Matthew)**



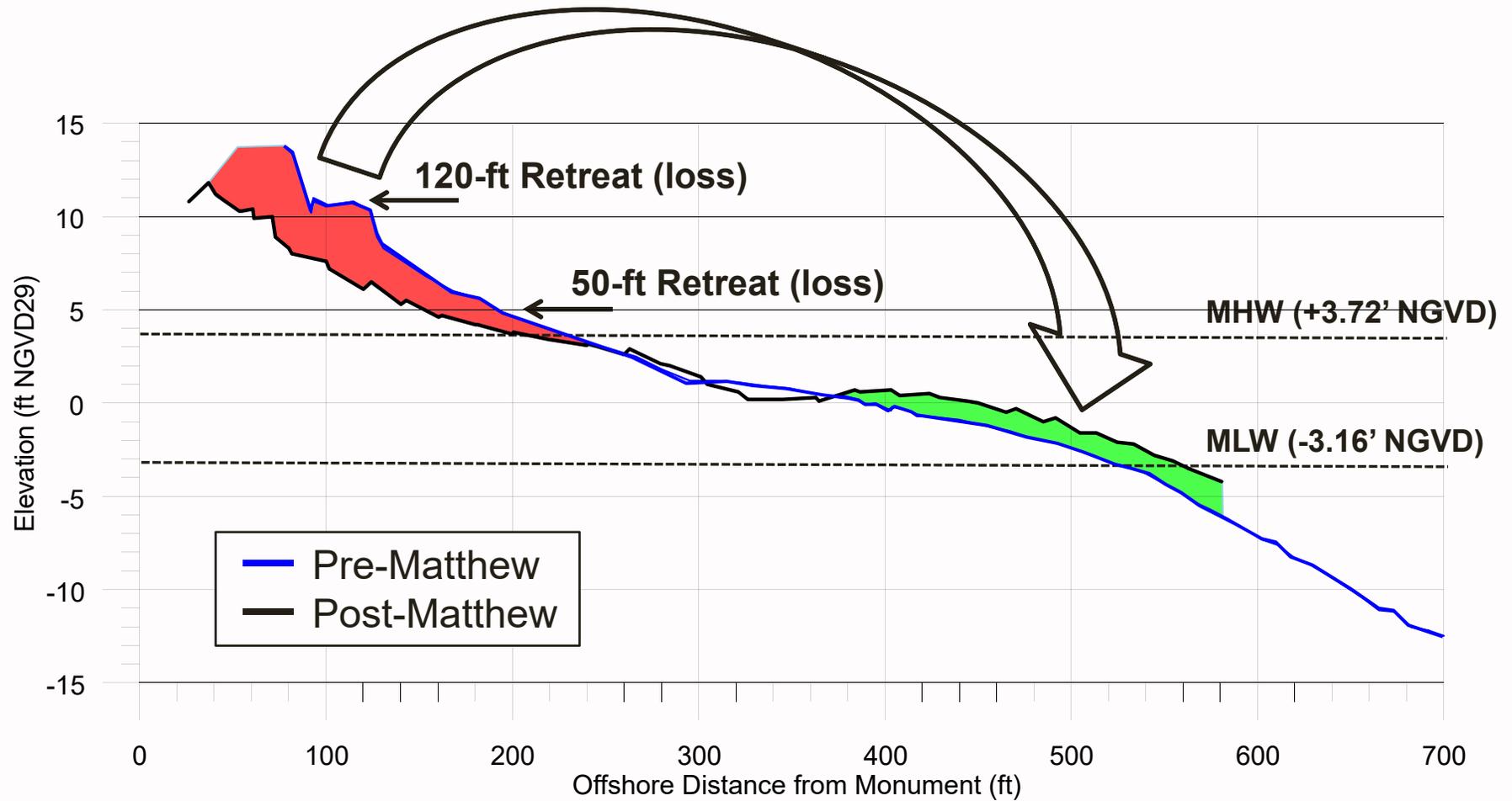
**October 2016  
(Immediate Post-Matthew)**



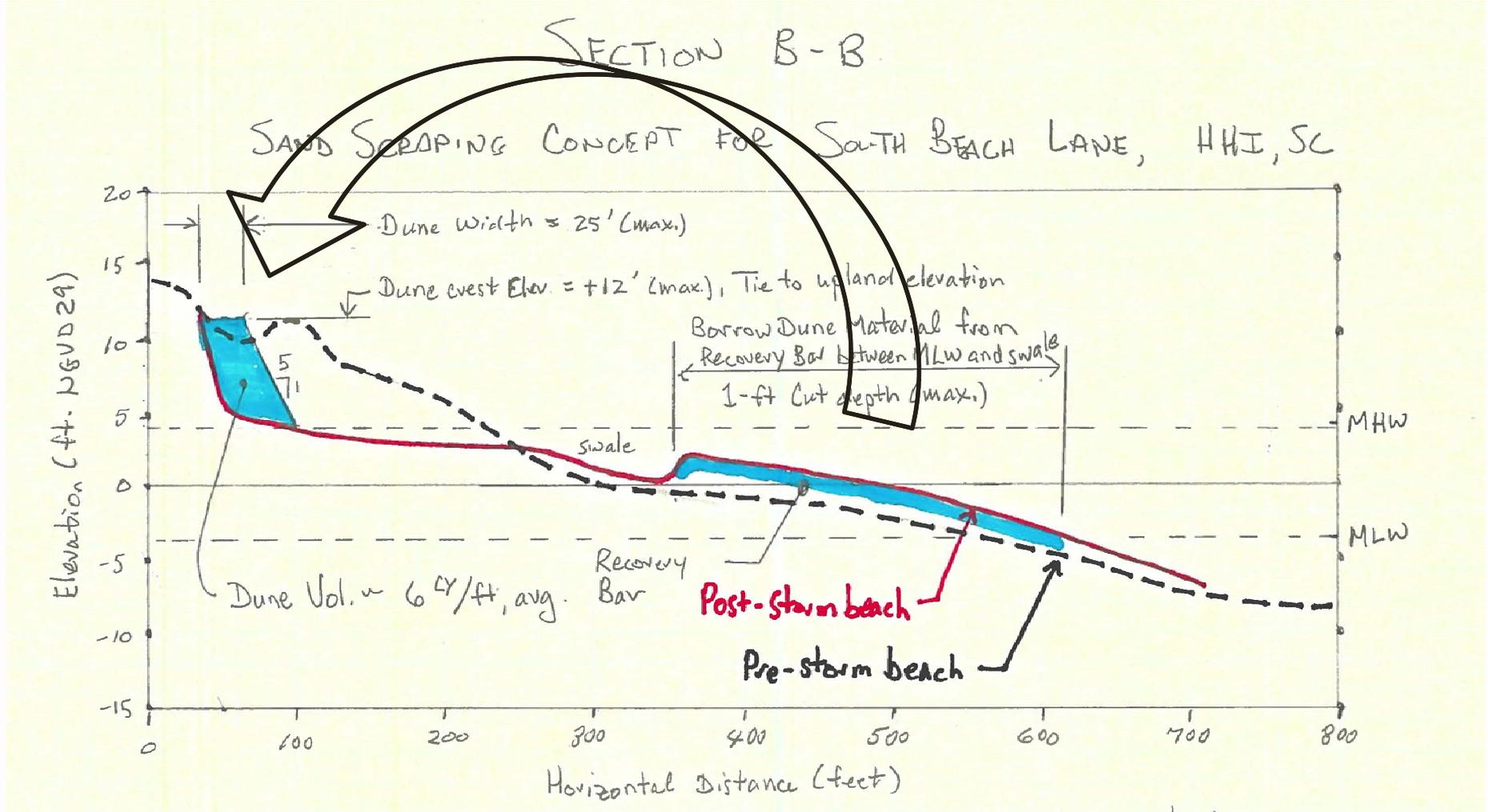
**60-120 feet of dune and vegetation  
loss (typical)**

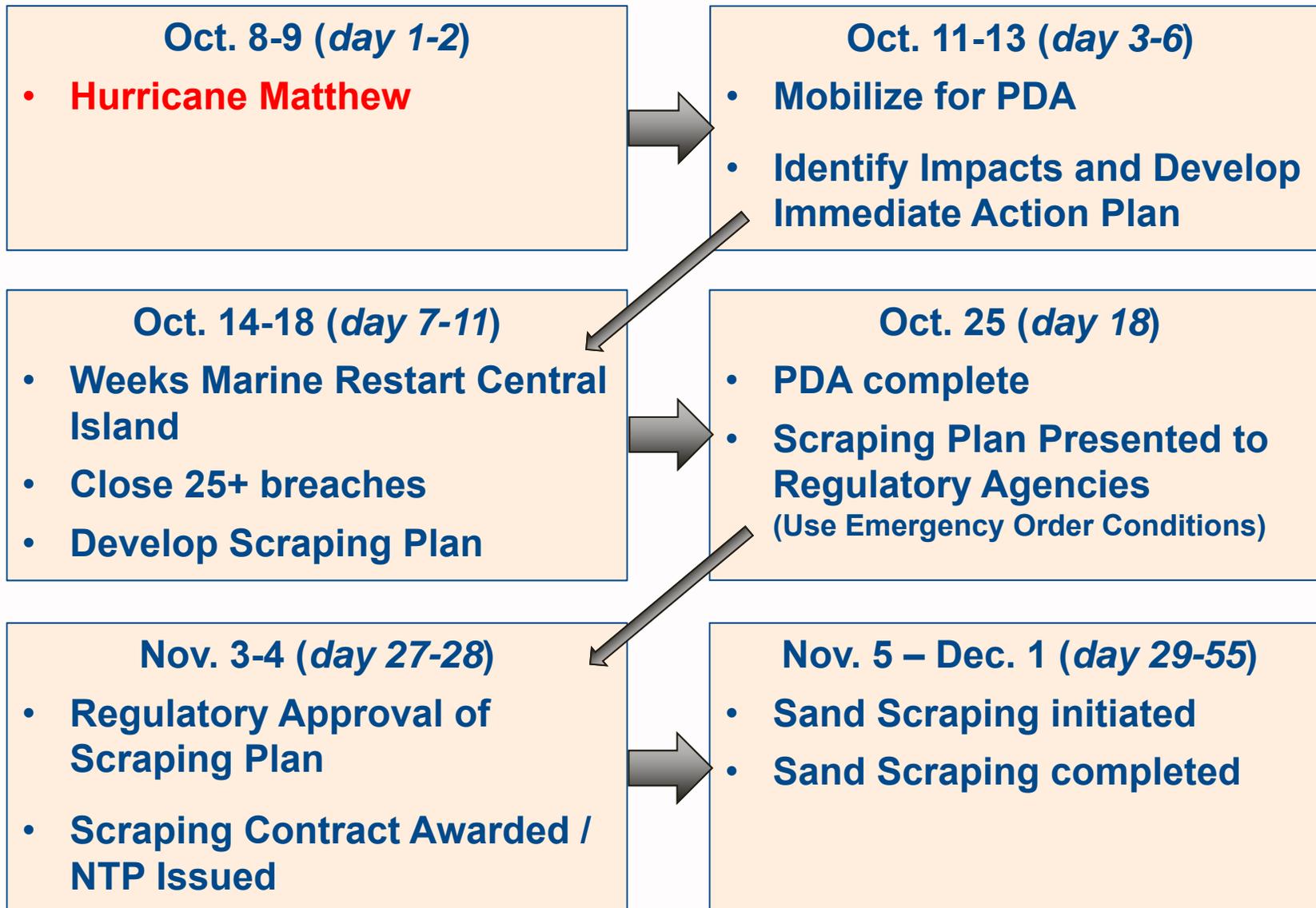


# Typical Erosion Profile



# Sand Scraping Details





# Hurricane Matthew Sand Scraping Timeline

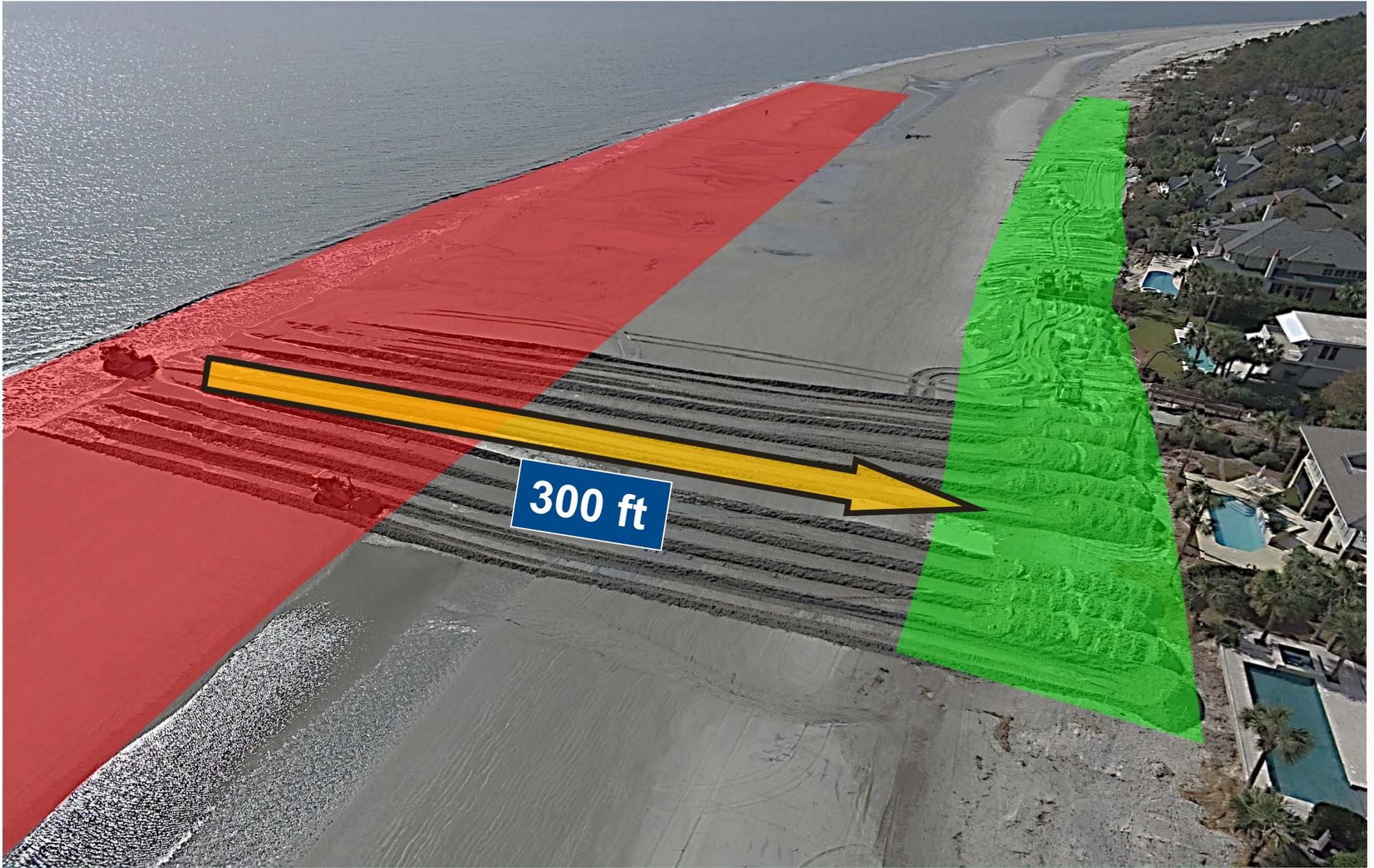




# Construction

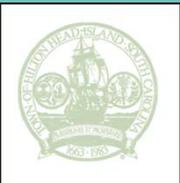


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# Construction

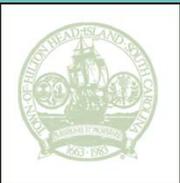




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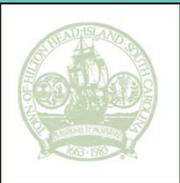


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# Construction





# Construction



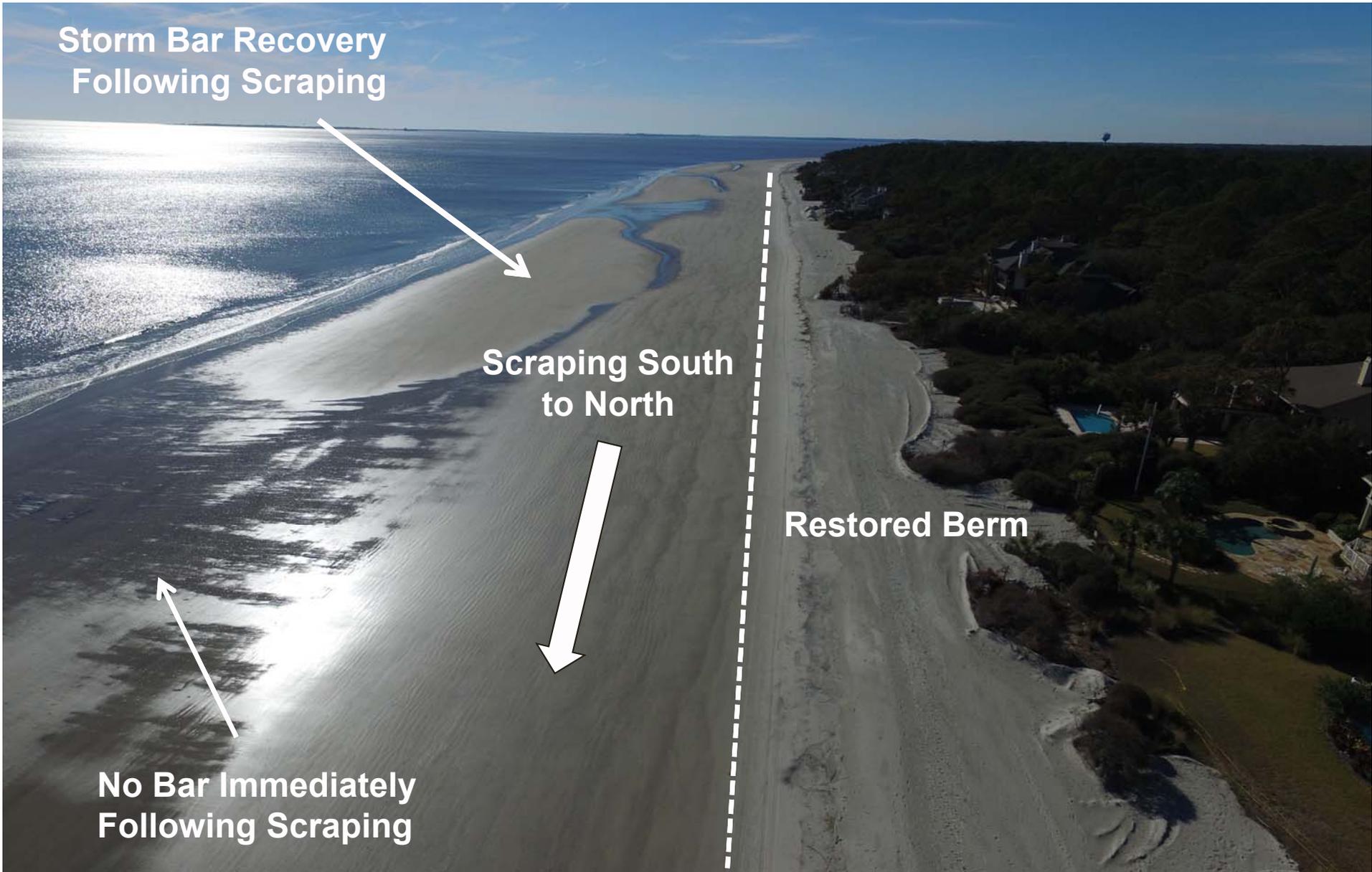
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# Construction



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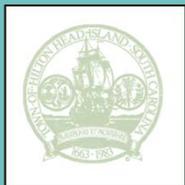


Storm Bar Recovery  
Following Scraping

Scraping South  
to North

Restored Berm

No Bar Immediately  
Following Scraping



**Completed**



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# Sand Scraping Project Summary

- **3,400 feet of shoreline**
- **21,700 cubic yards (~6.4 cy/ft, on average)**
- **Equipment: 2-3, Cat D6 – D8**
- **Project Cost:**
  - Mobilization = \$ 24,100.00
  - Payment Surveys (Before/After) = \$ 12,400.00
  - In-Place Sand = \$ 141,167.00
  - Total = \$ 177,667.00 (\$ 8.18 / cy)
- **Qualified as FEMA Category B Emergency Action**

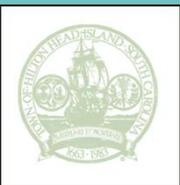
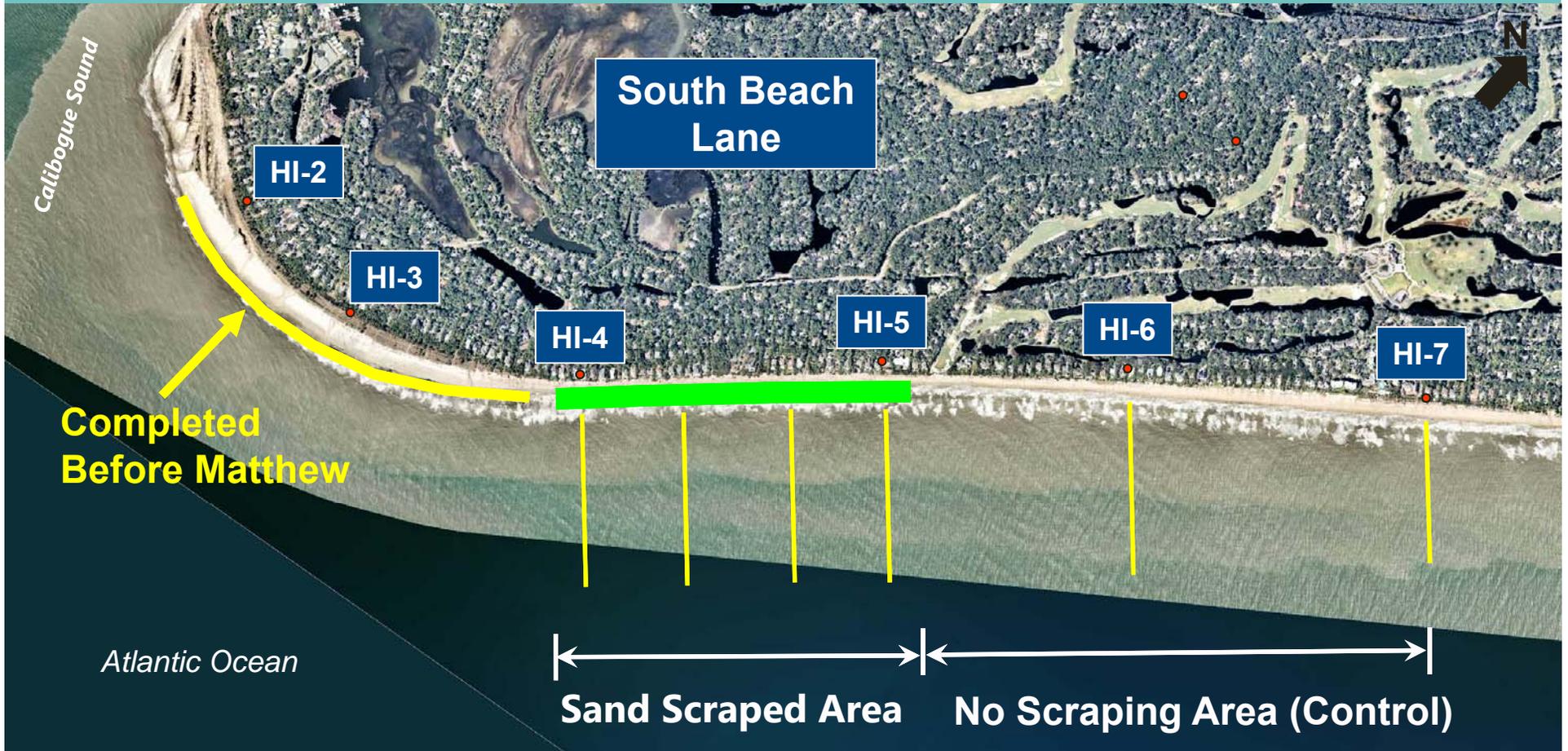


# Questions About Scraping

- **Did scraping enhance or diminish post-storm beach recovery?**
- **Was scraping an effective interim shore protection measure?**
- **What if scraping was not performed?**

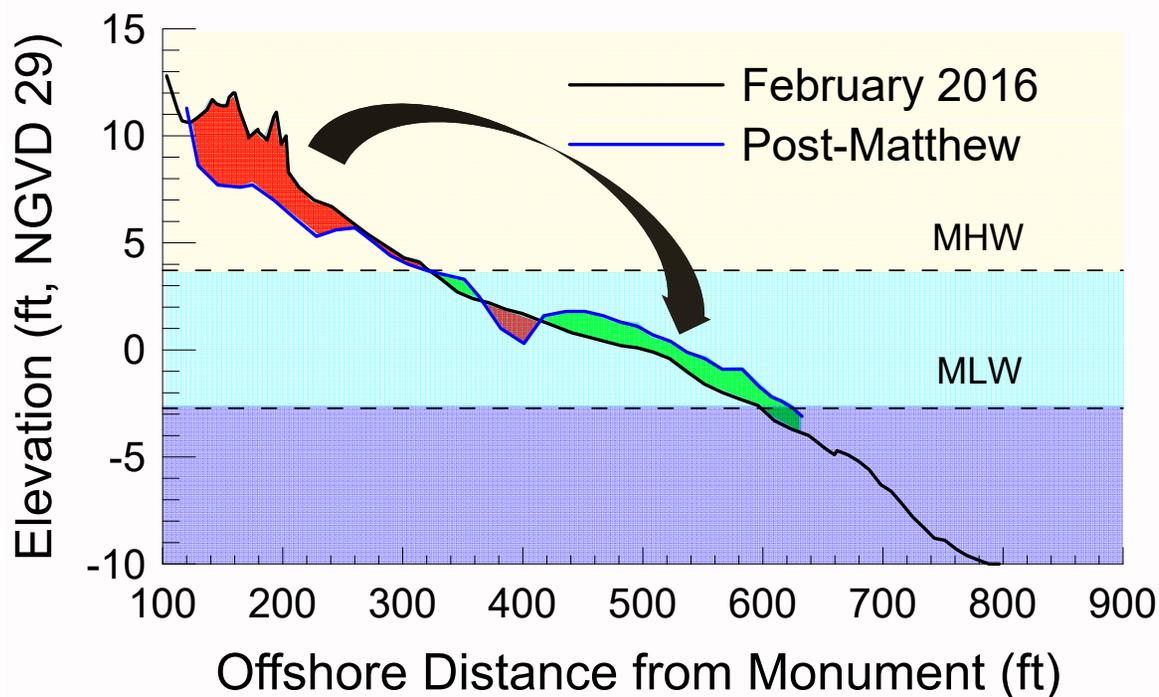


# Monitoring

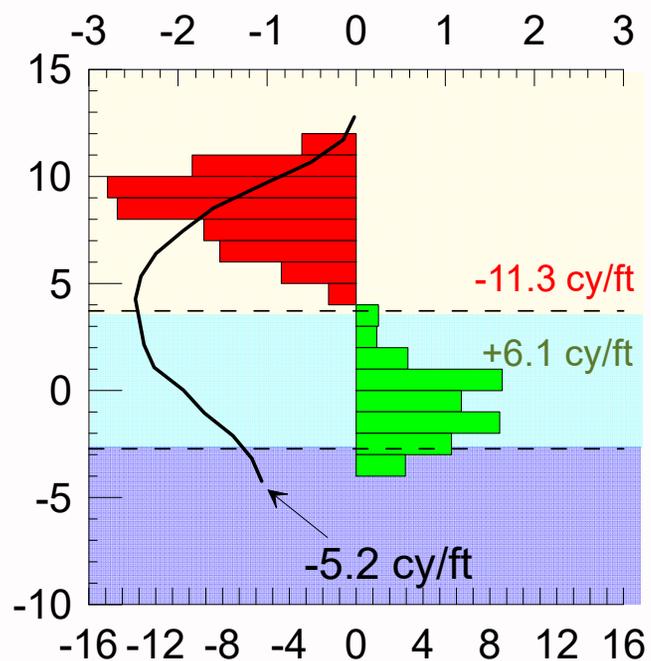


# Hurricane Matthew

**HI-05**

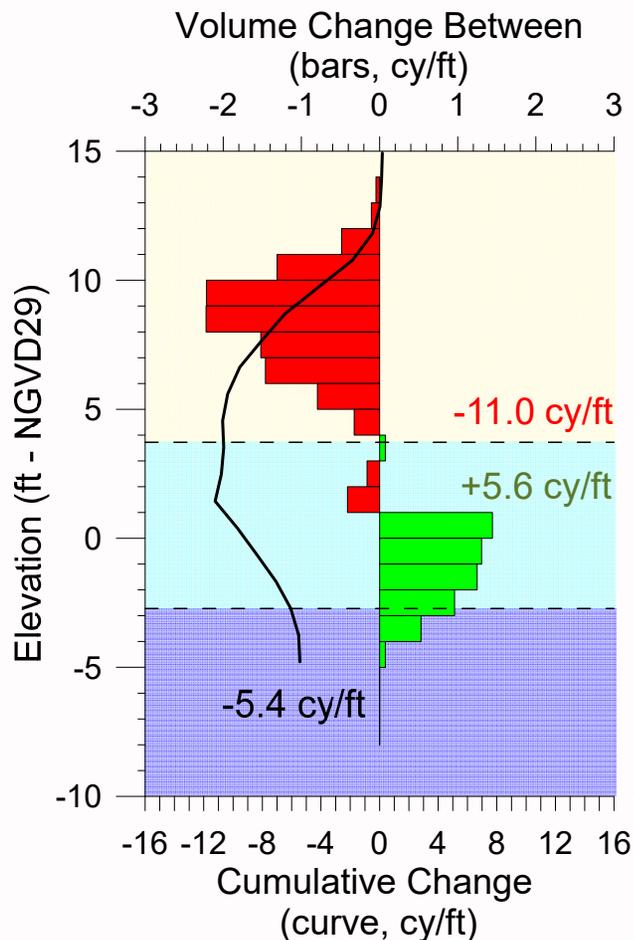


Sectional Volume Change  
(bars, cy/ft)

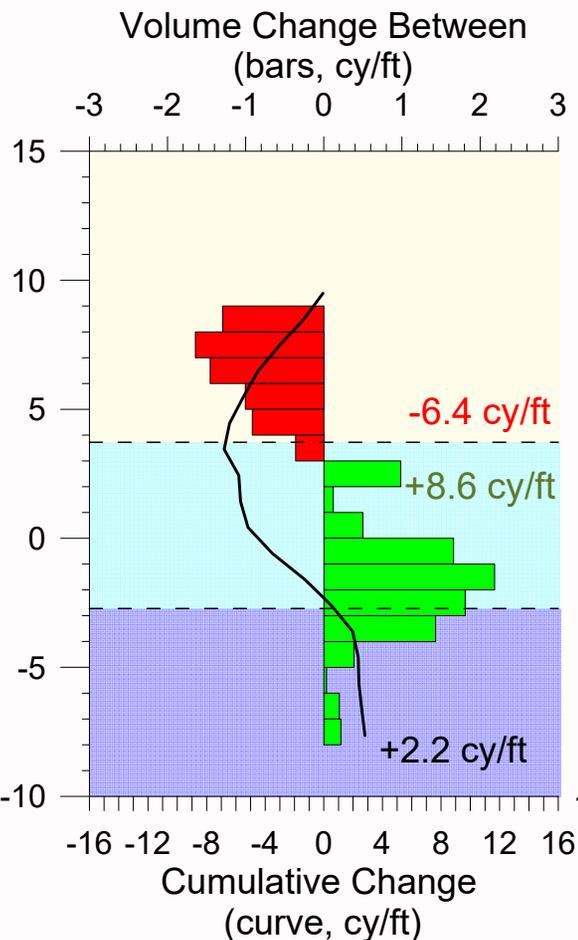


# Hurricane Matthew

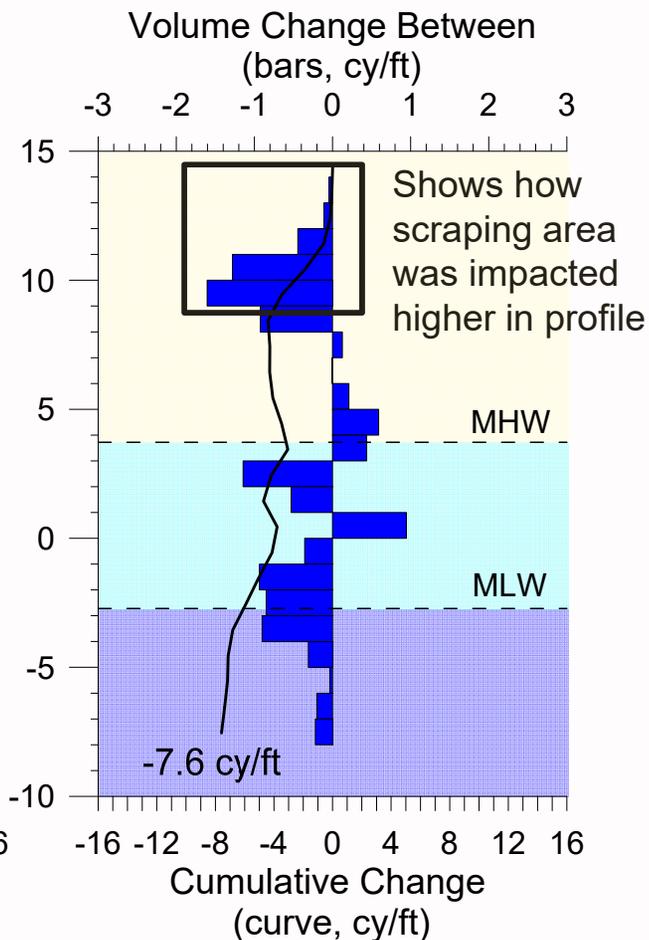
## Scraping Area



## Control Area

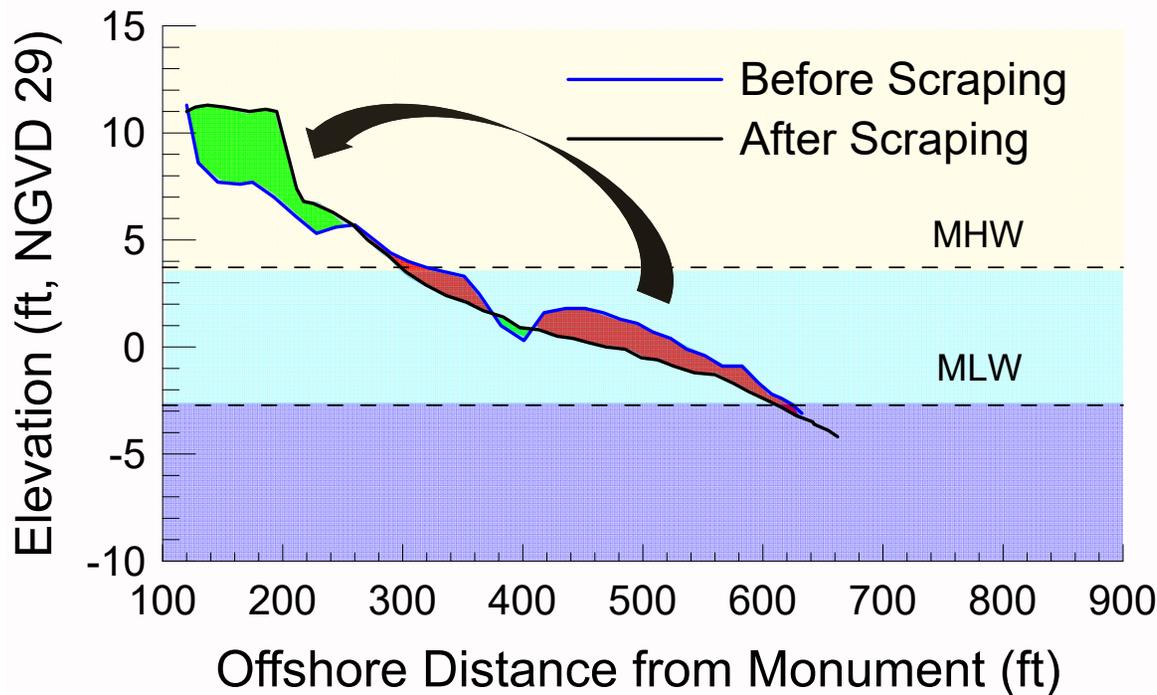


## Difference

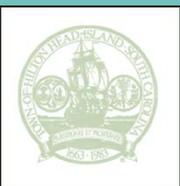
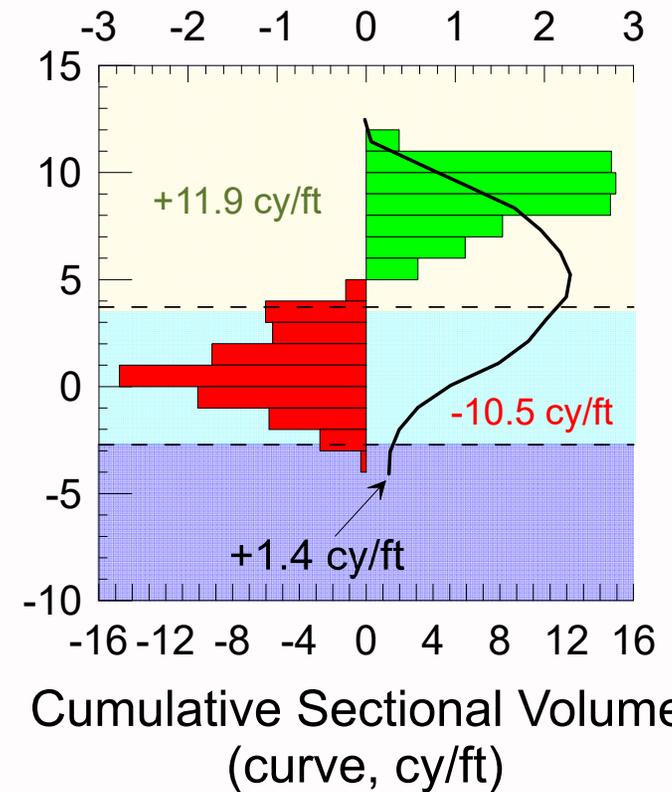


# Scraping Period

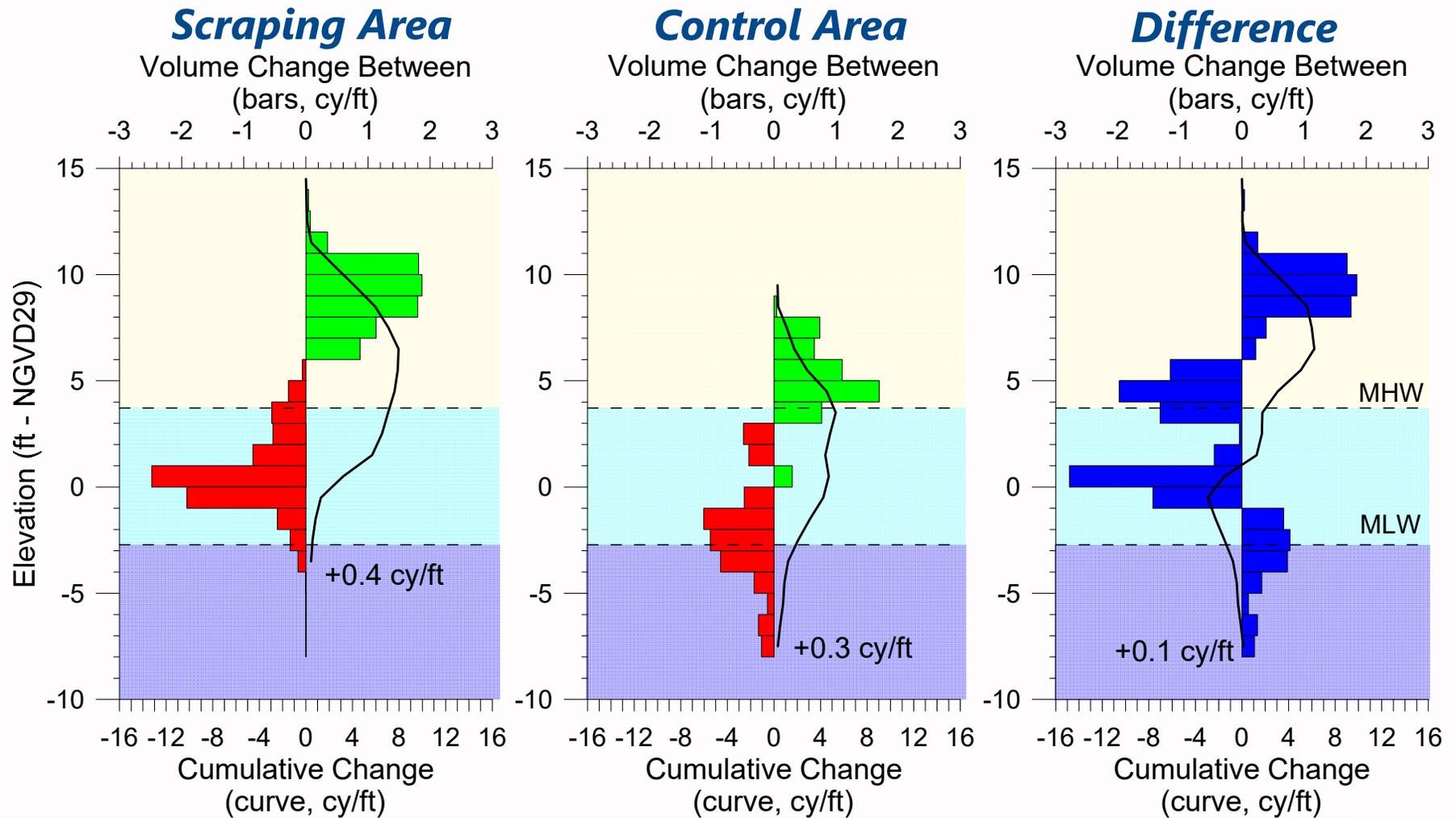
**HI-05**



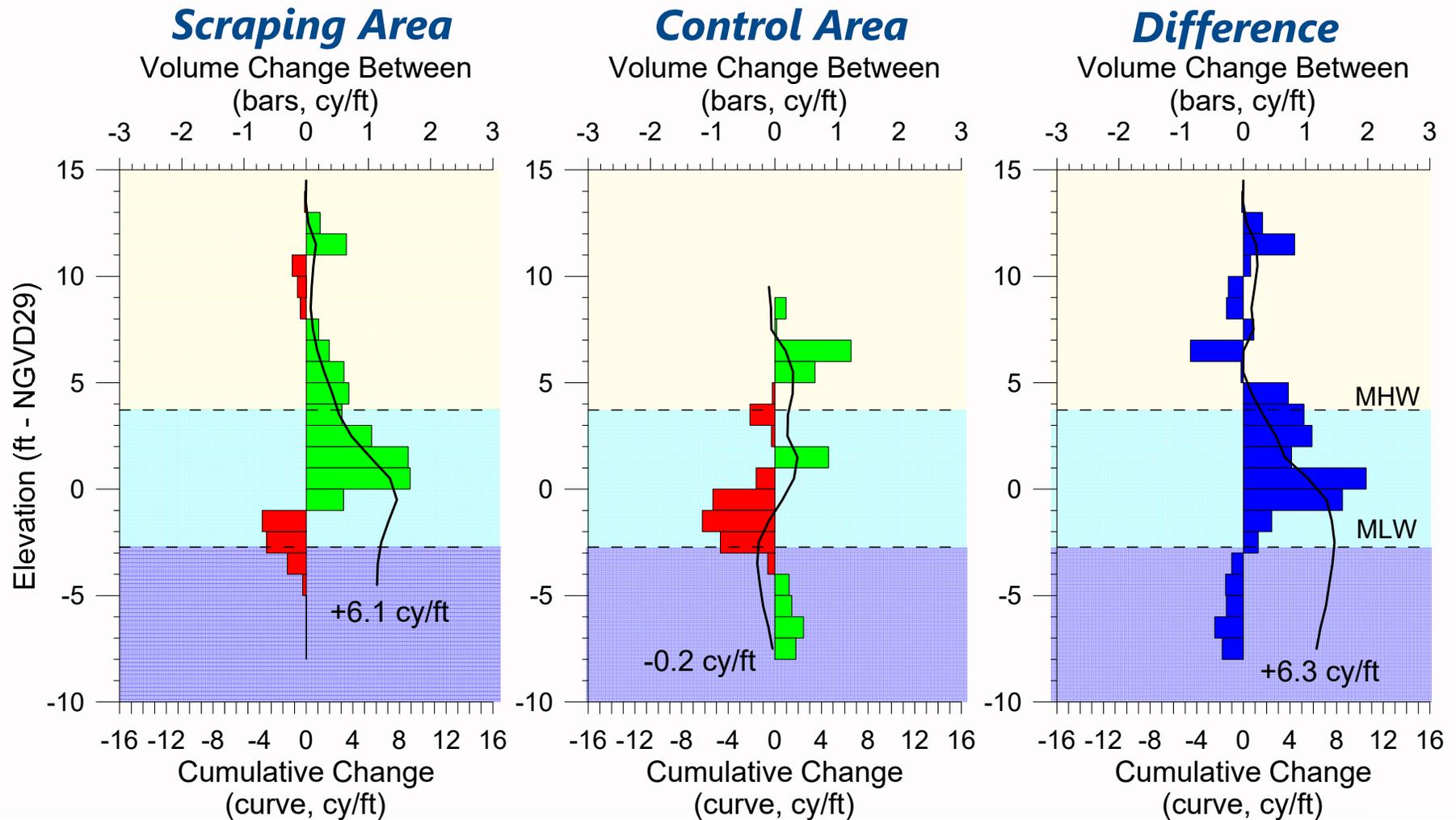
Sectional Volume Change  
(bars, cy/ft)



# Scraping Period



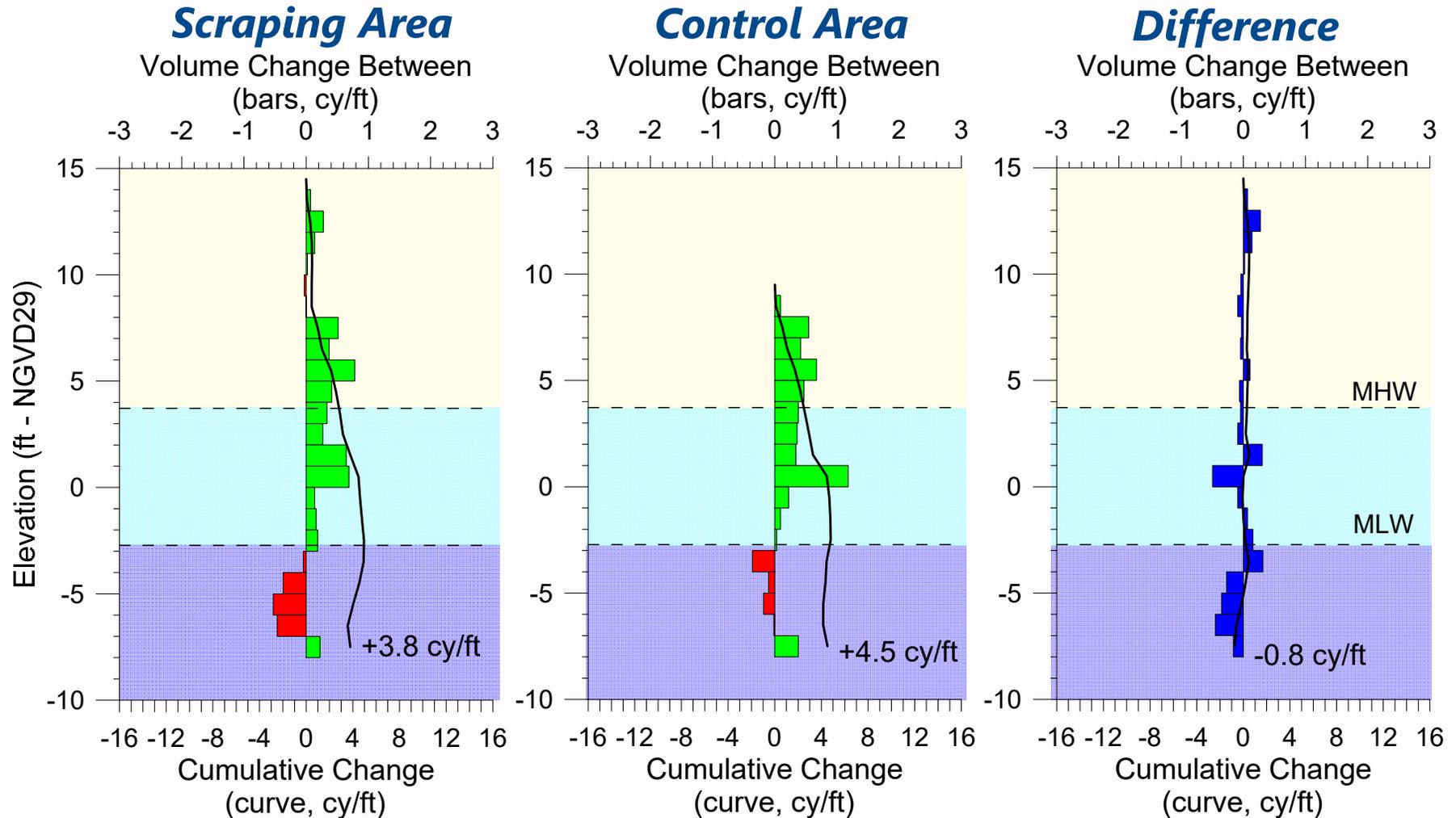
# Post Scraping (0-6 months)



Nov. 2016 – May 2017



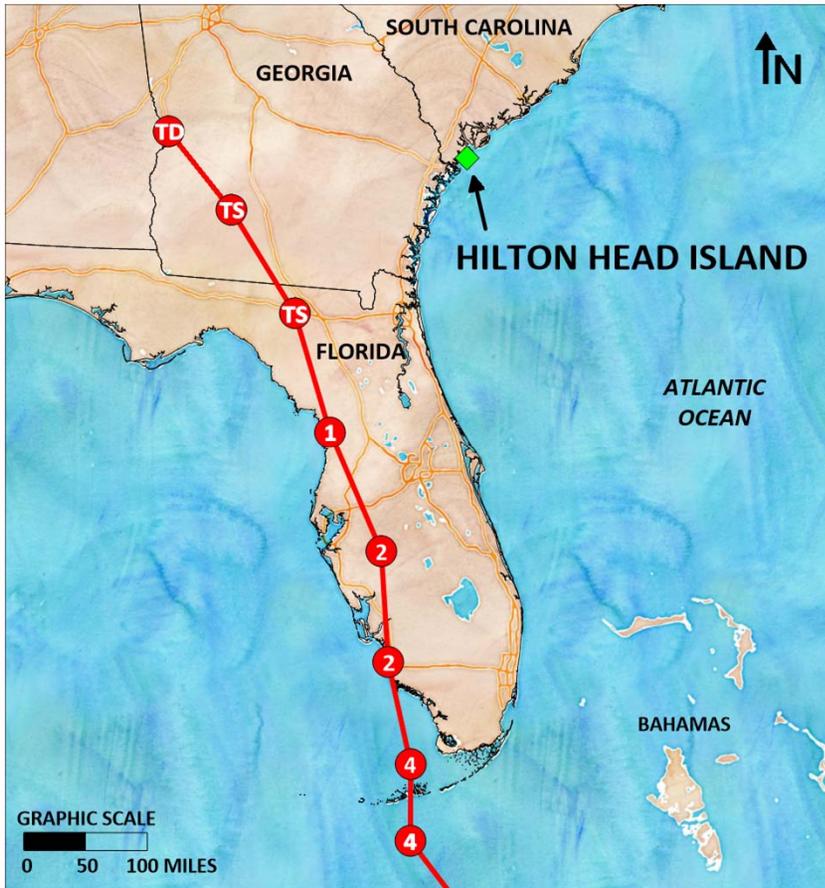
# Post Scraping (6-9 months)



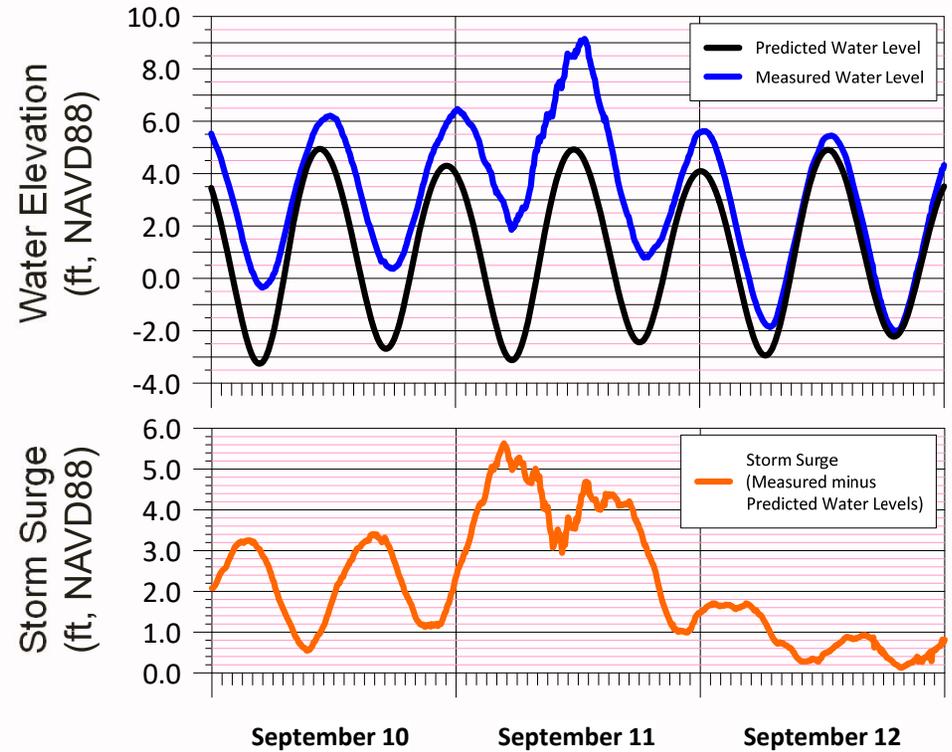
May 2017 – Aug. 2017



# Hurricane Irma



Savannah River Entrance: Fort Pulaski, GA  
(NOAA Station 8670870)



# Hurricane Irma - Sept. '17



South Beach Lane



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# Hurricane Irma - Sept. '17



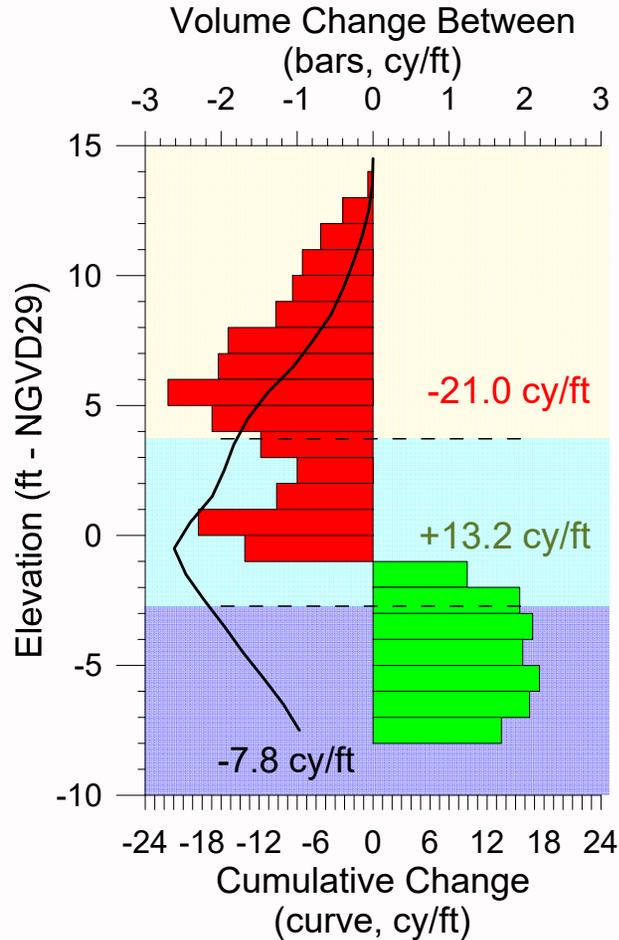
South Beach Lane



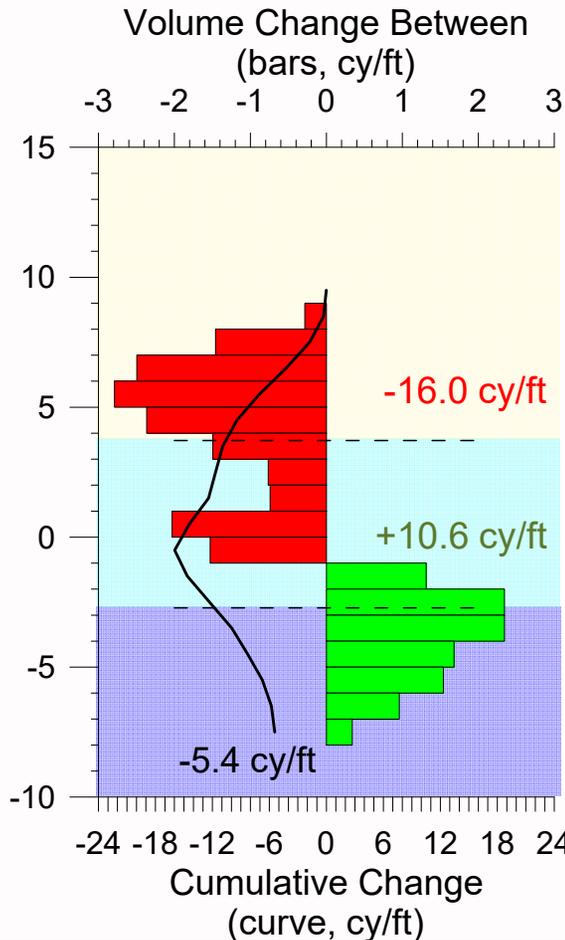
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# Hurricane Irma

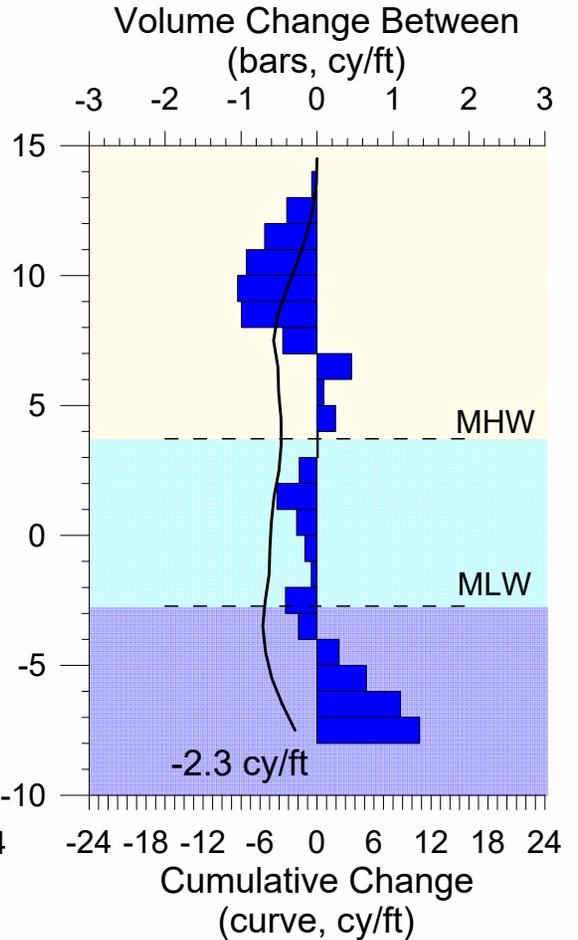
## Scraping Area



## Control Area



## Difference





# Summary



- **Did scraping enhance or diminish post-storm beach recovery?**
  - **Yes – dune likely would not have recovered above +8 ft**
  - **Bar recovered within 6 months following scraping**
  - **Beach behavior along scraped and non-scraped areas similar beyond 6 months**
- **Was scraping an effective interim shore protection measure?**
  - **Yes – There was no additional damage to infrastructure**
- **What if scraping was not performed?**
  - **No decisive answer, but appears to have mitigated Irma impacts to infrastructure exposed by Matthew**



# Take Away



- **Strategic beach scraping in certain post-storm scenarios is a viable emergency action**
- **A scraping project must be rigorously managed by the engineer and contractor**
- **Properly sized equipment plays a major role in achieving design goals**
- **Timing of work is imperative for continuous recovery**

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